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the Stomach a Sign of Cancer?

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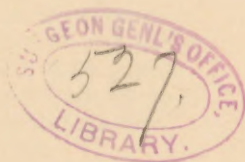


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FREE HYDROCHLORIC ACID—IS ITS ABSENCE FROM THE STOMACH A SIGN OF CANCER?

It is important to know whether free hydrochloric acid is secreted by the stomach. It is important to know whether its absence from the stomach is an indication of cancer of that organ. Prof. Wm. Osler, of the Johns Hopkins University, in his excellent work on "The Practice of Medicine," published in 1892, states that, "great stress has been laid of late years upon the absence of free hydrochloric acid in the secretions. As an outcome of the enormous number of observations which have recently been made, it may be said that free hydrochloric acid is absent in a majority of cases of cancer of the stomach. This defect is associated with impairment of the secreting function of the organs. The examination should be made repeatedly by the methods already referred to, and with our present knowledge the persistent absence of HCl in the stomach contents, taken in conjunction with other symptoms, may be regarded as highly suggestive of cancer. As Kinnicutt expresses it, 'the presence of HCl in the stomach in repeated examinations in doubtful cases is of the greatest diagnostic value, and points very certainly to absence of cancer.' Rosenheim has very recently shown that in cases in which cancer develops in the base of an old ulcer HCl may be present throughout the course."

Kinnicutt's statement can not be proved.

Rosenheim contradicts Osler. If "the absence of free HCl is associated with impairment of the secreting function of the organ," then why should a cancer situated at the base of an old ulcer form an exception to the rule when, as a matter of fact, the

ulcers themselves impair and often destroy the secreting function? If Rosenheim is right, then free HCl is absent in cancers not seated at the base of old ulcers. If cylindrical-celled epithelioma and encephaloid cancers constitute a major portion of all cancers affecting the stomach, as is stated by Osler, and if they have always a particular tendency to develop at the site of ulcers, scars and injuries, according to Paget, Holmes, Erichsen and others, then, if Rosenheim is any authority, are we not to conclude that free HCl must be present in the majority of cases of cancer of the stomach?

To obtain the gastric fluid for chemic examination, Ewald's test-breakfast is advised by the leading text-books. This consists in giving a roll of white bread and one glass of water or a cup of tea. One hour later, the contents of the stomach are removed with a rubber tube. No rule, no instruction of any kind, is given in any text-book whereby we may positively know that the stomach is actually empty at the time the test is applied. And in cases of stenosis of the pylorus it is not only possible, but probable, that the stomach is not entirely empty. However, as a result of Ewald's test, "free HCl should be present, but lactic acid absent." (Prof. Wm. Pepper, "An American Text-book of the Theory and Practice of Medicine," published in 1894, vol. ii, page 735). "Should contain free hydrochloric acid; should not contain sufficient lactic acid to be recognized by the ordinary tests." (Osler, page 345). Does it not forestall the judgment to proclaim what *should be* present? The usual object of a test is to ascertain what *is* present.

Physiologic chemistry contains no problem more difficult than the determination of free hydrochloric acid in the gastric juice. Many authors assert its presence as a normal constituent, and of the analyses *quoted*, in Foster's "Physiology" for example, no two agree; they vary in the proportion of free acid all the way from .05 to .5 per cent.

The method of chemic analysis commended and

relied upon by two of America's foremost teachers let us critically and briefly examine. "The best and simplest test," says Osler, "is that of Gunzbürg: phloroglucin, 2; vanillin, 1; absolute alcohol, 30. To a drop of the gastric contents (better filtered) add a similar quantity of the reagent on a porcelain plate. On evaporation gradually to dryness over a flame, a beautiful rose-red color begins to appear at the edges if HCl is present. This is merely a test for a free mineral acid, but HCl is the only one present in the gastric juice. This test is extremely delicate, and is not interfered with by albuminates, acid salts, or organic acids." (Pepper, vol. II, page 735). The simplicity of Gunzbürg's proceeding would be valuable if the test were reliable. But color tests as a rule are unreliable; and this of Gunzbürg forms no exception.

Gunzbürg's test is not a test for free hydrochloric acid. It will show the presence of free HCl where none existed previous to its application. Sodium chlorid is a constituent of the gastric juice. If lactic acid is present in the stomach contents, evaporation of a drop over a flame will concentrate the acid, which will then attack the sodium chlorid and form free HCl. Other concentrated acids will do the same.

Gunzbürg's test is not a test for a free mineral acid. The identical rose-red tint will be obtained when no free mineral acid is present. Many foods that contain no acid, mineral or other, taken into the stomach will produce precisely the same rose-red tint of the supposed test. Again, there are acids formed in the body, not mineral acids, that will produce the same brilliant rose-red tint of the so-called test. For example, in those who possess the oxalic diathesis, oxalic acid is formed in the living body by oxidation.

Oxalic acid decomposes dry sodium chlorid when heated, with evolution of hydrochloric acid (Fownes' "Chemistry," page 658; Brande and Taylor, page 384).

Oxalic acid responds perfectly to the Gunzbürg test

in the presence of sodium chlorid. Oxalic acid exists in many of our food plants, as a salt of potash, and is widely distributed in vegetation. Bin-oxalate of potash is found in common sorrel, wood sorrel, and in garden rhubarb associated with malic acid (Fownes,' page 659). It exists in great abundance in tomatoes and in many other acid fruits.

Gunzbürg's test is utterly, absolutely worthless, as proved by the following experimentation:

Experiment 1. With a minute quantity of bin-oxalate of potash, sodium chlorid and lactic acid, Gunzbürg's test yields on evaporation over a flame a rose-red tint identical with that produced in the presence of free hydrochloric acid.

Experiment 2. With a minute quantity of bin-oxalate of potash, sodium chlorid and tartaric acid, the same brilliant rose-red tint is obtained when evaporated over a flame in the presence of the Gunzbürg test solution. Baking powders contain tartaric acid. A biscuit or a roll of bread, as in the Ewald test-breakfast raised with baking powder, contains tartaric acid. And wines contain tartaric acid.

Experiment 3. Bin-oxalate of potash and sodium chlorid, dissolved in water, and Gunzbürg's test added, yield when heated over a flame a rose-red tint identical with that produced by free hydrochloric acid.

Experiment 4. Tartaric acid and sodium chlorid, dissolved in water, and Gunzbürg's test added, yield when heated over a flame a rose-red tint identical with that produced by free hydrochloric acid.

Therefore, if a patient suffering from a cancer of the stomach were to eat a little rhubarb or tomato or take a drink of wine and Gunzbürg's *test* were to be applied to his gastric contents, it would be conclusively proved that he had no cancer!!

Uncombined hydrochloric acid is not found in nature, except as an occasional volcanic product (Brande and Taylor, page 216). No mineral acid is necessary in the process of digestion. Pavy ("Food and Dietetics") states that HCl has no particular

property in rendering the digestive power of the gastric juice more energetic. The presence of free hydrochloric acid as a normal constituent of the gastric secretion has never been demonstrated. The only way to *positively prove* its presence is to separate the acid; just the same as you would be required to separate arsenic from the contents of the stomach in a supposed case of poisoning by that mineral.

The absence of free hydrochloric acid as a normal constituent of the gastric secretion has been repeatedly proved by the most competent authorities, including such original investigators as M. Claude Bernard, the profound French physiologist, Robin, Verdeil, and Professor Rogers, the able chemist of the University of Pennsylvania. Our illustrious American physiologist, John C. Dalton, taught that lactic acid is the normal acid constituent of the gastric secretion. He neither taught nor acknowledged the presence of free HCl.

Prof. Carl Seiler records a series of highly interesting experiments in the *Philadelphia Medical Times*, Feb. 6, 1875, which go far to prove that no hydrochloric acid is present in the gastric secretions.

The most remarkable line of experimentation ever conducted upon the gastric secretion remains unnoticed by any author, compiler, or text-book, within our knowledge. These extraordinary experiments seem to have been forgotten. These experiments, unquestionably the most exhaustive, as well as the most authoritative upon this subject, were conducted under circumstances both exceptional and fortuitous, in the physiologic laboratory of the University of Pennsylvania. The gastric contents were those of a criminal (Heidenblutt). He was of strong physique, and was executed two hours after partaking of a hearty breakfast. Immediately after the execution, his stomach with its contents were removed to the laboratory of the University. The lining of the stomach was carefully scraped, and this with the contents

of the stomach were macerated, filtered and distilled. The examination was made by Robert M. Smith, and to quote from an article in the *Philadelphia Medical Times*, Feb. 13, 1875: "The following deductions confirm entirely those obtained by Profs. F. G. Smith and Rogers of the University, from the analysis of the gastric juice of Alexis St. Martin:

"1. The gastric juice presents an acid reaction both before and after filtration and distillation.

"2. The acidity in this instance was not due to the presence of hydrochloric acid.

"3. Lactic acid did exist.

"4. Acid phosphate of lime showed no evidence of its presence.

"5. Neutral phosphate of lime did exist, and was held in solution by the lactic acid.

"I would take this opportunity of expressing thanks to Mr. Geo. Hay, a member of the class, and a gentleman of great experience as an analytical chemist, under whose careful supervision these experiments were conducted." Hay states that "free HCl is never present in the human stomach, unless introduced from without; that it would seriously damage it if present; and that it is impossible for it to be found in the stomach, for the reason that its *liberation from a salt of any kind requires the presence of a concentrated acid*, and any concentrated acid in the stomach would quickly destroy the organ. *Concentrated acids are not secreted by the stomach. Free mineral acid is not a product of the stomach of man or animal. Its absence is not a sign of cancer.*" The researches of Bernard, Robin, Verdeil, Dalton, Smith, Rogers, and Hay, all original investigators, entirely agree.

